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Multilayer structure including an active electrochemical material and ionic polymer in an electrochemical cell

Description of Technology: The present invention relates to a melt extrusion process for making multilayer articles, particularly multilayer articles having electrical or ionic conductivity. The articles are suitable for use in electrochemical applications, such as batteries, fuel cells, electrolysis cells, ion exchange membranes, sensors, electrochemical capacitors, electrochromic windows, and modified electrodes. Of particular interest is the use in lithium-ion batteries.

Patent Listing:

1. **US Patent No. 6986967**, Issued January 17, 2006, "Multilayer structure including an active electrochemical material and ionic polymer in a electrochemical cell"
   http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,986,967.PN.&OS=PN/6,986,967&RS=PN/6,986,967

Market Potential: A battery can be made of one or more cells, usually connected to achieve a particular voltage and/or capacity. A cell includes three major components: the positive electrode, the negative electrode, and an electrolyte. A porous, polyolefin-based separator is also commonly present to prevent electrical contact between the two electrodes. In practice, a cell often also contains anode and cathode current collectors which are conductive layers, usually metallic, each of which will have tabs for external connection. A battery often also requires a package which may contain several individual cells and out of which the tabs will protrude.

Melt extrusion processes to form multilayer articles from polymeric materials are known in the art. These processes offer lower investment and higher capital productivity as compared with solvent coating processes. Multilayer extrusion processes offer the additional advantage of fewer process steps and further increased productivity.

The global battery market is about $50 billion US, of which roughly $5.5 billion is allocated to rechargeable (secondary) batteries. The growth is estimated at 6% annually through 2006. China, India, Brazil, the Czech Republic and South Korea will record some of the strongest market gains.

Benefits:

- Minimizes exposure of the components to shear and elevated temperatures
- Forms a macroscopically homogeneous mass

Applications:

- Fields involving electrical or ionic conductivity/Batteries

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